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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/225,189	01/05/1999	RICHARD J. QIAN	SLA0095	2766

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EXAMINER

HANNETT, JAMES M

ART UNIT	PAPER NUMBER
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2612

16

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/225,189

Applicant(s)

QIAN, RICHARD J.

Examiner

James M Hannett

Art Unit

2612

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 April 2004.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-10 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 31 December 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments filed 4/16/2004 have been fully considered but they are not persuasive. As for the argument that the prior art does not teach the generation of a probability map, and that the replacement of background pixels includes using weighted values for pixel values of the input image and the different background determined by the probability map.

Brady teaches on Column 8, Lines 14-33 that the probability that a pixel is in the foreground is calculated for each pixel in the image and a foreground weight image is formed. Therefore, because a probability value is calculated for each pixel in the image, a two-dimensional representation of pixels each with a corresponding probability of being a background image is formed. This is viewed by the examiner as a probability map; Column 7, Lines 46-49. Furthermore, Parulski et al teaches on Column 6, Lines 15-17 that border feathering can be utilized to better enhance border effects. Brady et al teaches on Column 8, lines 15-24 the use of using image-weighted values for pixel values of the input image and the different background determined by the probability map in order to perform background replacement.

The examiner does not view the limitation that "the probability function is calculated directly for each pixel" as necessitating that the probability function is calculated without the use of a lookup table. The inclusion of the word directly is very broad and does not add any meaningful limitation to the claim, and is not viewed by the examiner as necessitating that the probability function is calculated without the use of a lookup table.

The applicant argues that the combination of references does not teach the use of anisotropic diffusion after an initial classification. Parulski et al teaches that additional refining

Art Unit: 2612

steps can be used to better classify foreground and background pixels. This additional refining step is performed after the initial classification that is performed. Furthermore, Parulski et al teaches that the refining step can utilize a noise reduction algorithm. The smoothing process is viewed as the additional refining, and the anisotropies diffusion occurs within the smoothing process and is therefore performed after the initial classification.

### ***Claim Objections***

Claim 1 is objected to because of the following informalities: Line 12 reads {"...input mage and the different...". The word mage is a typo and should be changed to image.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1: Claims 1, 2, 4-6,9,10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

USPN 5,914,748 Parulski et al in view of USPN 5,684,898 Brady et al.

2: As for Claim 1, Parulski et al teaches on Column 1, Lines 38-43 the use of having an electronic imaging system take multiple images, including an image of a subject plus background and an image of the background without a subject. Parulski et al teaches on Column 1, Lines 43-58 how the two images can be compared and the object in the foreground can be separated from the background; Parulski et al teaches in Figure 1 the step of separating foreground and

Art Unit: 2612

background images using the difference between a first and second image. Purlaski et al further teaches in Figure 2, and on Column 3, Lines 47-64 the details of the difference calculation.

Parulski et al further discusses in Column 3, Lines 30-40 that the comparison of the two images to classify the background image are performed on a pixel-by-pixel basis. Parulski et al teaches on Column 3, Lines 39-45 that an additional processing or refining step is necessary to create a suitable foreground mask image. Parulski et al depicts in Figure 1 a method of replacing an original background image with image data from a different background. Parulski et al teaches on Column 6, Lines 15-17 that border feathering can be utilized to better enhance border effects. Parulski et al further teaches on Column 2, Lines 37-44 that a new composite image is formed from the combination of the original foreground and new background image.

Parulski et al does not specifically state that the calculation performed during image foreground determination is performed using a probability function. Parulski et al further does not teach using weighted values for pixel values of the input image and the different background determined by the probability map.

Brady et al teaches a method for subtracting the background from an image with a foreground and background. Brady teaches the method for characterizing the background pixels from the foreground pixels involve the use of a probability function Column 8, Lines 14-19. Bradley teaches on Column 8, Lines 14-33 that the probability that a pixel is in the foreground is calculated for each pixel in the image and a foreground weight image is formed. Therefore, because a probability value is calculated for each pixel in the image, a two-dimensional representation of pixels each with a corresponding probability of being a background image is formed, This is viewed by the examiner as a probability map; Column 7, Lines 46-49.

Art Unit: 2612

Furthermore, Brady et al teaches on Column 8, lines 15-24 the use of using image weighted values for pixel values of the input image and the different background determined by the probability map.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the step of classifying the foreground pixels from the background pixels using a probability function as taught by Brady et al in the method for generating composite image of Parulski et al in order to better classify the foreground pixels from the background pixels.

Furthermore, Parulski et al teaches the method of first capturing an image with a foreground object and a background, and second capturing an image with just a background object. It would have been obvious to one of ordinary skill in the art at the time the invention was made to capture first the background with no foreground and capturing second an image with a background and a foreground. This is because the processing to determine the background and foreground pictures is performed after both pictures are taken.

3: As for Claim 2, Parulski et al teaches on Column 3, Lines 65-67 and Column 4, Lines 1-25 that the additional processing step or refining step is performed separately for each R,G,B color layer. Parulski et al teaches that the additional processing step processes the R, G, and B difference images by separate RGB lookup tables. This is equivalent to processing in normalized RGB chromatic color space.

4: In regards to Claims 4-6, Parulski et al teaches on Column 5, Lines 1-20 that the background replacement technique can be applied to moving subjects as well as still subjects.

Art Unit: 2612

Parulski et al further teaches that multiple background plus subject images or just a single background plus subject image can be taken.

5: As for Claim 9, Parulski et al teaches on Column 5, Lines 1-20 that the background replacement technique can be applied to moving subjects and that the camera can be driven to capture a motion sequence of images or video.

6: As for Claim 10, Parulski et al teaches on Column 3, Lines 20-22 that the new composite image is displayed on a monitor or printed using a printer. Therefore, the printed image constitutes an outputted still image.

7: Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,914,748 Parulski et al in view of USPN 5,684,898 Brady et al in further view of USPN 5,382,980 Gehrmann.

Parulski et al in view of Brady et al teaches the claimed invention as discussed above in Claim 1, Parulski et al teaches on Column 3, Lines 65-67 and Column 4, Lines 1-25 that the additional processing step or refining step is performed separately for each R,G,B color layer. Parulski et al teaches that the additional processing step processes the R, G, and B difference images by separate RGB lookup tables. Parulski et al does not teach that the refinement step or additional processing step can be performed in YCbCr color space. Gehrmann teaches in the abstract a method for background replacement of an image that has a further improvement process having the background and foreground signals comprised of a red component (Cr), a blue component (Cb) and a luminance component (Y). Gehrmann teaches that this method is advantageous because an improvement of the picture quality can be achieved while using a smaller number of components. Therefore, It would have been obvious to one of ordinary skill

Art Unit: 2612

in the art at the time the invention was made to perform the refining step as taught by Parulski et al in the YCbCr color space as taught by Gehrman in order to achieve an improvement of the picture quality while using a smaller number of components

8: Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,914,748 Parulski et al in view of USPN 5,684,898 Brady et al in further view of USPN 5,825,909 Jang.

Parulski et al in view of Brady et al teaches the claimed invention as discussed above in Claim 1, Parulski et al teaches on Column 3, Lines 43-46 that an additional refining step is used to better classify foreground pixels and background pixels. Parulski et al teaches that this process can be achieved by utilizing a noise reduction algorithm to reduce the noise in the difference image. Parulski et al does not teach that the additional processing step can use anisotropic diffusion to better classify the foreground and background pixels. Jang teaches on Column 6, Lines 47-66 that the first step for segmenting an image is the step of image smoothing. Jang further teaches on Column 7, Lines 40-47 that anisotropic diffusion filters may be used for the image-smoothing step. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Parulski et al to utilize the image segmentation process of Jang that includes a first step of image smoothing using an anisotropic diffusion filter for the refining step in order to better segment the foreground image from the background image.

9: Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,914,748 Parulski et al in view of USPN 5,684,898 Brady et al in further view of USPN 5,710,602 Gardos et al.



Art Unit: 2612

Parulski et al in view of Brady et al teaches the claimed invention as discussed above in Claim 1, Parulski et al teaches on Column 3, Lines 43-46 that an additional refining step is used to better classify foreground pixels and background pixels. Parulski et al teaches that this process can be achieved by utilizing a noise reduction algorithm to reduce the noise in the difference image. Parulski et al does not teach that the additional processing step can use morphological filtering to better classify the foreground and background pixels. Gardos et al teaches on Column 8, Lines 33-37 that it is advantageous to use a morphological filter after an initial pixel-level mask is generated in order to decrease the false foreground detections, which tend to occur along stationary edges. Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to perform morphological filtering as taught by Gardos et al in the additional processing step of Parulski et al in order to decrease the false foreground detections which tend to occur along stationary edges.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

Art Unit: 2612

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M Hannett whose telephone number is 703-305-7880. The examiner can normally be reached on 8:00 am to 5:00 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy Garber can be reached on 703-305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James M. Hannett  
Examiner  
Art Unit 2612

JMH  
June 14, 2004

  
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